



Universities should require faculty to actively participate in community science activities and view the promotion of education and mentoring of minorities as meritorious.

Editorial

Leadership Is Required for Getting American Minorities into Research

The United States has witnessed unprecedented changes in its racial makeup. By way of emphasis at different times in this editorial, I examine the fastest-growing minority in America today, the Hispanics [Chicano (Mexican American), Latino, and Puerto Rican groups], keeping in mind that similar trends and outcomes may be seen for other groups. The U.S. Census data on Hispanics (1) indicate they have the highest fertility rates in America and will soon surpass African Americans as the largest minority. Census projections reveal that within 50 years the Hispanic population will be approximately 100 million. Recent projections by state and race/ethnicity of high school students from now until 2012 (2) reveals important demographic data that cannot be ignored. The three prominent minorities, Hispanics (primarily Mexican Americans and Puerto Ricans), African Americans, and Native Americans, will show sharp increases in numbers while the white, non-Latino student numbers will level off. Leadership in our government and throughout research academic institutions and industry must consider that the three major minority groups will approach in number one-half of our nation's population early in the next century.

Upon examination of the composition of science and engineering (S&E) graduate programs and the S&E research institutes and industries, our nation's leaders must acknowledge the possible future consequences if numbers of minorities in the S&E fields, at the highest levels, do not keep pace with their demographics. The total combined number of individuals with doctorates in the three historically underrepresented minorities remains unconscionably low in all S&E fields (3,4). Taking the increased numbers of these groups into account, the overall combined numbers of doctorates in these minority groups is worse. There is, therefore, a national emergency to once and for all time reverse the underrepresentation in our country of the composition of our research workforce.

How does environment affect the presence of minority groups in the scientific workforce? If children are the future of our country, then what does it say if America has more hungry children than other industrialized nations? The latest annual report on world hunger by Bread for the World (5), a citizen's lobby group, estimates that 13.6 million American children under the age of 12 are either hungry or are at risk of hunger, and most are minority children. One in three minority children is poor and, in certain pockets of our country, a full two-thirds of children less than 6 years of age live near or below the poverty line (6). Poverty contributes to overall poor living conditions, suboptimal health, and lack of health insurance, poor nutrition, and inaccessibility to adequate health care facilities. Poverty is also related to increased youth risk attributes, such as single-parent homes, low parental education, limited English proficiency, low family income, sibling dropouts, and spending more than 3 hours each day alone (7).

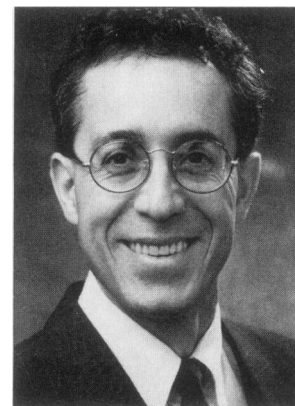
For Hispanics, the fastest growing minority group, low education achievement raises danger signals. Today, according to U.S. Census data (1), our nation's Hispanics include almost 20% of 8th grade students. Recent findings of the Hispanic Association of

Colleges and Universities indicate that, in many areas of our country, only 53% of Hispanics (and 30% of African Americans) finish high school; of those that finish high school, only one in nine will attend a 4-year university. While minority health professionals make a big difference in health, education, and research within minority communities, it is noteworthy that, in 1992, only 4% or 632 out of 15,365 physicians who graduated in 1992 were Hispanic (3). Only 1.4% of nurses and 2.6% of 151,000 U.S. dentists are Hispanic. Finally, only 1.7% of graduate school students and 2% of engineering students are Hispanic (3,4).

Adverse health and mental concerns (8,9) disproportionately affect minority communities. Hispanics have disproportionately higher rates of heart disease and obesity. New HIV/AIDS cases among children and young women in cities are black and Latina women (10,11). Minority teens will probably also be burdened by last year's 180% increase in HIV/AIDS (12). Gonorrhea and congenital syphilis is 60-fold greater in blacks than whites. Alcoholism and cirrhosis of the liver are prevalent among Mexican Americans. Hispanic teenagers report heavier drinking of alcohol and at a younger age than other groups, and alcohol predisposes them to violent crime, assaults, rape, diseases, and academic problems (13). Current smoking prevalence estimates for Hispanics exceed those for the U.S. population overall, concomitant with lung cancer due to tobacco products, which doubled between 1970 and 1980 and continues unabated (8). Tuberculosis and diabetes are other health concerns for minority communities.

Yet other concerns related to environmental health are those that affect farmworkers, who are exposed to pesticides and other chemicals implicated as causes of cancer and birth defects. Endrin, a pesticide banned in 1974, has been detected within the Rio Grande Valley. Heptachlor and DDT were recently detected by the EPA in the fish caught and eaten by people in South Texas. In the Los Angeles, California, area, 50% of Chicanos/Latinos live within some of the most polluted air and are overrepresented in manufacturing and hazardous chemical jobs. Some reports indicate that blood lead levels of minority children exceed normal values (14,15).

Minority women and nonminority women suffer disease and violence disproportionately, which lowers education expectations and outcomes. National Center for Health Statistics data show teenage illegitimacy ratios to be 75.9% as of 1994, up from 29.5% in 1970 and 67.1% in 1990. A staggering 50% of the girls that drop out of high school do so because of teen pregnancy (16). There were 6 million sexually transmitted diseases diagnosed last year among women, with 68% to women under 24 years of age (12). Consider S&E career education in the context of other statistics on domestic violence (17,18). This year, 700,000 women in America will be sexually abused or raped, and 4 million women



will be assaulted. One woman will be battered every 12 seconds. About 28% of husbands physically abuse their wives, and 40% of physical and emotional abuse cases occur in unmarried relationships; this is the same percentage for dating teens. There are 13,000 acts of violence against women in the workplace, and every month 50,000 women seek restraining orders. One-half of homeless women and children are fleeing domestic violence. Sadly, $\geq 50\%$ of abused women in turn beat their children. Finally, children of abused mothers are at sixfold greater risk for suicide and 50% more likely to be substance abusers.

Research-intensive academic institutions that receive large amounts of taxpayer research dollars from government (e.g., the National Institutes of Health investigator-initiated research awards and training grants) must stop relying solely on standardized test scores as a major criterion for admission (19–21), especially since the Educational Testing Service has shown no correlation between scores and final dissertation quality and outcomes. The net effect of scores as a major criterion is the recruitment of foreign students, which possibly decreases opportunities for American minorities being considered for admission to graduate programs (22,23). Articles in two recent issues of *The Chronicle of Higher Education* described the increased recruitment in Latin America by U.S. colleges (24) and the need for universities to develop new strategies to compete for students from Asia (25). Furthermore, few research-intensive institutions have research faculties who actively recruit on minority campuses while aggressively recruiting in foreign countries. On top of this, there is general acceptance of the lack of mentoring of students throughout their educational experience. Consider the loss to minorities applying for and enrolling in professional schools caused by inflamed antiaffirmative action policies and hostile environments as evidenced by sentiments being openly expressed on campuses.

Despite the problems mentioned above, all of which can be viewed as benign neglect of our minority communities that have a negative impact on education, recent data show increases in bachelor's degrees awarded to racial/ethnic minorities in science and engineering (26). This notwithstanding, many of these deserving American students will not be admitted to professional programs if the easy way out is to recruit foreign students and rely on standardized tests for admission (21–23). Leadership at all levels of government, industry, and research universities, therefore, must have a vision to concretely address the absence of minorities in S&E fields. The children of all American taxpayers should have access to higher education. Majority schools must embrace affirmative actionlike methods to recruit and admit historically underrepresented, multi-generational minorities from underprivileged backgrounds and, equally important, must develop retention and mentoring strategies. Majority and publicly supported academic/government research institutions should develop or augment existing remedial programs and internship work-study initiatives. Universities receiving tax dollars for research should require faculty to actively participate in community science activities and view the promotion of education and mentoring of minorities as meritorious (not just conducting extramurally funded research for publications).

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